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28. On a Dipneumone Spider (*Risdonius parvus*, gen. et sp. n.), the Female of which has reduced Palpi.

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(Plates I.–III.*)

Reduction of the palpi is now known to occur in the females of spiders belonging to the genera *Pseudanapis*, *Anapogonia*, *Symphytognatha*, and *Chasmocephalon*. The respiratory systems of *Pseudanapis algerica* (E. Simon), *Pseudanapis relicta* Kratochvil, and *Chasmocephalon* sp. have been examined by Louis Fage (1937), who has shown that in the females of these and certain other apneumone spiders a constant relation exists between the absence of the palpi and that of the posterior tracheæ.

The present paper deals with a dipneumone spider, *Risdonius parvus*, gen. et sp. n., which has a respiratory system of the usual type found in the Argiopidæ. In external features, especially in the reduction of the palpi of the female, it closely resembles the apneumone species belonging to the genera *Chasmocephalon* and *Pseudanapis*. Its systematic position is discussed below.

Family Argiopidæ.

Subfamily *Gasteracanthinæ*.

Risdonius, gen. n.

Carapace strongly convex. Head well elevated. Cervical groove forming a deep cleft on each side. Eight eyes, heterogeneous. The anterior median eyes alone diurnal and the smallest of the group. The four anterior eyes in a strongly recurved line. The four posterior eyes in an almost straight line. Ocular quadrangle longer than wide. Clypeus very high. Cheliceræ without a condyle, promargin armed with teeth, retromargin without teeth. Legs 1, 2, 4, 3. Tarsi much longer than metatarsi and provided with three tarsal claws and with serrated bristles forming spurious claws. Short spines present on tarsi and metatarsi of the first two pairs of legs. Trichobothria on all tibiæ and metatarsi. Palpi of female reduced to the coxal segment with its maxillary lobe and a minute rudiment of the trochanter. Palpi of male with patellar and tibial apophyses. Abdomen strongly chitinized and furnished with dorsal and epigastric scutes. A pair of pulmonary spiracles in front of the epigastric furrow and a single median tracheal spiracle immediately in front of the spinnerets. Web orbicular.

Genotype : *Risdonius parvus*, sp. n.

Type-locality.—East Risdon, Tasmania.

* For explanation of the Plates, see p. 660.

RISDONIUS PARVUS, sp. n.

Male.—Measurements in millimetres :—

Total length	1·14
Length of cephalothorax	0·48
Width of cephalothorax	0·46
Length of abdomen	0·75
Height of abdomen	1·07
Width of abdomen	0·70

Leg.	Femur.	Patella.	Tibia.	Metatarsus.	Tarsus.	Total.
1	0·73	0·22	0·67	0·22	0·46	2·30
2	0·52	0·19	0·47	0·16	0·38	1·72
3	0·41	0·15	0·34	0·15	0·33	1·38
4	0·53	0·16	0·44	0·18	0·37	1·68

Colour.—Cephalothorax and appendages brown. Abdomen brown in front and at the sides. A golden-brown patch round the spinnerets. Dorsal and epigastric scutes dark brown.

Carapace.—Strongly convex. Head part finely granulose. The cervical groove forms a deep cleft on each side. The posterior margin of the groove is furnished with a row of six tubercles, three on each side ; the anterior margin has a procurved row of five tubercles, one median in position and two on each side. In addition to these tubercles there are five or six others on the caput, between the cervical groove and the eyes. Each tubercle carries a fine bristle. Thoracic part coarsely granulose posteriorly and at the sides. The cephalothorax forms a short tubular projection which fits into an opening in the epigastric scute of the abdomen and surrounds the pedicle (Pl. I. figs. 1 & 2).

Eyes.—Eight eyes in two rows. The four anterior eyes form a strongly recurved line ; those of the posterior row are in an almost straight line. AME are the smallest of the group, the eye-ratio being AME : ALE : PME : PLE=12 : 17 : 17 : 17. A recurved row of four short bristles behind AME and a single bristle close to the inner margin of each PLE. Ocular quadrangle longer than wide (Pl. I. figs. 2 & 3).

Clypeus.—Very high, about seven times the diameter of AME, sloping slightly to the front and furnished with a few small scattered bristles (Pl. I. fig. 3).

Cheliceræ.—Condyles and stridulating ridges absent. Basal segment 0·246 mm. long and clothed in front with a few coarse hairs. Margins long and oblique. Promargin armed with three evenly spaced teeth. Retromargin without teeth, but with a light scopula consisting of six or seven long barbed hairs (Pl. II. fig. 10).

Maxillæ.—Slightly longer than broad, outer margin rounded, converging in front of labium and provided with a well-developed serrula and scopula.

Labium.—Wider than long and does not appear very mobile. It is furnished with a few long hairs.

Sternum.—Convex, cordiform, rebordered, longer than wide in ratio 15 : 13. It is widest immediately in front of the coxæ of the second pair of legs. Posteriorly it is truncated between the hind coxæ, which are widely separated. The surface is coarsely granular and furnished with a few long hairs which point inwards and frontwards (Pl. I. fig. 4).

Legs.—1, 2, 4, 3. The first pair of coxæ are much longer than the others. All the coxæ are somewhat globose. In each leg the tarsus is more than twice as long as the metatarsus. The podomeres are slightly granular and lightly

clothed with hairs. Each patella is provided with a small erect curved bristle on the dorsal side near the base and with a much larger erect bristle at the apex. Each tibia has a coarse erect bristle on the dorsal side near the middle. On the prolateral surface of the first and second metatarsi there are two short spines in a longitudinal row. A similar row of six small spines, evenly spaced, on the prolateral surface of the first tarsi and a row of three on the prolateral side of the second tarsi. Elsewhere there are no spines on the legs. One trichobothrium occurs on each metatarsus, three on the first and second tibiæ, two on the third tibiæ, and four on the fourth tibiæ ; elsewhere none (Pl. II. figs. 5 & 6). Three tarsal claws are present. They are very small and without teeth. Several serrate bristles acting as spurious claws occur at the end of each tarsus (Pl. II. fig. 7).

Palpi.—There is no sign of reduction in the male palpi. All the podomeres are fully developed, their lengths being as follows : Trochanter 0·06 mm., femur 0·18 mm., patella 0·14 mm., tibia 0·15 mm., and tarsus 0·29 mm. On the retrolateral side the base of the patella is produced into a blunt curved apophysis. The tibia is concave on the ventral side and forms a short retrolateral apophysis. The cymbium is spoon-shaped. It is clothed with a few short hairs. A paracymbium is absent. The form of the genital bulb in a slightly expanded condition is shown in Pl. II. fig. 9. The tip of the embolus is protected by a conductor and a somewhat spatulate terminal apophysis.

Abdomen.—High, partly overhanging the carapace. The antero-dorsal surface forms three longitudinal folds. The postero-dorsal surface is covered by a tough chitinous scute, which has a V-shaped notch at its apex and a row of small oval sclerites round its lateral margins. The sides of the abdomen form three longitudinal folds, which are continuous between the dorsal scute and the spinnerets. These folds are reinforced by three rows of small sclerites.

The ventral surface of the abdomen in front of the epigastric furrow is covered by a large chitinous plate, which extends round the pedicle to the dorsal side. Anteriorly this plate is provided with a pair of coarsely granular protuberances, one on each side, which, by rubbing against the granulations on the posterior part of the cephalothorax, may function as stridulating organs. On the posterior lateral corners of the plate are the slit-like apertures of the book-lungs. Immediately behind the epigastric furrow is a somewhat triangular scute extending from side to side. Between this and the spinnerets are two transverse rows of small oval sclerites. The spinnerets are surrounded by a chitinous wall, which, posteriorly on the ventral side, forms a small median lobe covering the tracheal spiracle. A small colulus and six spinnerets are present. Short hairs clothe the abdomen.

Female.—Measurements in millimetres :—

Total length	1·37
Length of cephalothorax	0·56
Width of cephalothorax	0·44
Length of abdomen	0·82
Height of abdomen	1·19
Width of abdomen	0·81

Leg.	Femur.	Patella.	Tibia.	Metatarsus.	Tarsus.	Total.
1	0·64	0·20	0·52	0·19	0·41	1·96
2	0·49	0·19	0·38	0·15	0·36	1·57
3	0·37	0·15	0·30	0·15	0·13	1·28
4	0·48	0·16	0·40	0·16	0·36	1·56

The female (Pl. III. fig. 11) resembles the male in coloration and general appearance, and hence only the following characters need be described :—

Legs.—On the prolateral surface of the first tarsi there are three small spines in a longitudinal row. In a similar position on the second tarsi is a row of two spines. On the prolateral surface of the first and second metatarsi there is one small spine. Elsewhere none.

Palpi.—The female palpi are reduced to a minute tubercle inserted in a small circular depression on the antero-lateral surface of the maxillæ near the base (Pl. III. fig. 13).

Abdomen.—The dorsal surface is tough and provided with a number of small sclerites, but lacks the scute possessed by the male. The ventral surface, however, is furnished with a large epigastric scute, which extends forward from the epigastric furrow and surrounds the pedicle of the abdomen. On the posterior lateral corners of the scute are the apertures of the book-lungs and between them the epigynum. The form of the epigynum as seen in transparent preparations is shown in Pl. III. fig. 12. Behind the epigastric furrow is a crescent-shaped scute extending from side to side. As in the male the spinnerets are surrounded by a chitinous wall. A median tracheal spiracle lies immediately in front of the spinnerets and is concealed by the chitinous wall. The abdomen is lightly clothed with short hairs each mounted on a small sclerite. When the abdomen is not distended its surface is marked by a series of folds resembling those described in the case of the male.

Locality.—Tasmania : East Risdon, 30th June, 1937, 6 males and 4 females ; Trevallyn, 13th July, 1937, 2 males and 11 females.

Types.—The type-specimens and a series of paratypes will be placed in the Australian Museum, Sydney. Duplicates will be sent to the British Museum.

Habits and Web.

Risdonius parvus occurs in lightly wooded gullies, where it makes its web under logs, stones, and grass tussocks in cool and shady situations. It is interesting to note that *Symphytognatha globosa* Hickman, another spider in which the female is palpless, is also often found under the same stones or in the same grass tussocks as *Risdonius parvus*.

The web of *Risdonius parvus* is of the typical orbicular type and is suspended in a horizontal plane. A female specimen of this spider, kept amongst some grass stalks in a small glass jar in the laboratory, spun a web, which was so placed that it could be examined under a binocular microscope. The web measured 27 mm. in diameter. The viscid spiral consisted of 89 turns and was built on a framework of 55 radii, six of which were thicker and stronger than the others. Adjacent turns in the viscid spiral were 0·123 mm. apart. There were fourteen viscid droplets in a space of 0·03 mm. The non-viscid spiral consisted of only two or three turns round the meshed hub. No stabilimentum was present. A small free space separated the viscid from the non-viscid spiral. When at rest the spider occupied the centre of the web on the lower side.

Egg-sac, Hatching Period, and the Young.

Specimens of *Risdonius parvus* kept in the laboratory made egg-sacs during the period August to November. The egg-sac consists of two unequal valves. The lower valve is deep and cup-shaped and is covered by the more shallow upper valve (Pl. III. fig. 14). The whole egg-sac measures 1·16 mm. high and 1·39 mm. in diameter. It is made of white silk and so loosely woven that

the eggs are visible from the outside. Some egg-sacs contain four, others only three, eggs. These are oval and measure about 0·464 mm. long and 0·427 mm. wide.

The hatching period for the eggs in four egg-sacs made during the period September to November is shown in the following table :—

Date of laying.	Date of hatching.	Number of days.	Number and sex of young.
27th Sept.	30th Oct.	33	3 ♂♂, 1 ♀
1st Nov.	24th Nov.	23	2 ♂♂, 2 ♀♀
20th Nov.	14th Dec.	24	2 ♂♂, 1 ♀
28th Nov.	17th Dec.	19	2 ♂♂, 1 ♀

The young ones remain in the egg-sac from 10 to 12 days after hatching.

There is no difficulty in distinguishing the sex of the newly hatched spiderlings, since the palpi of the males are well developed, whereas those of the female are represented by nothing more than a small tubercle, as in the adult. Reduction of the female palpi, therefore, is not a post-embryonic process. These appendages either do not develop or else become atrophied during embryonic life.

Systematic Position of Risdonius parvus.

In external features *Risdonius parvus* closely resembles spiders belonging to Simon's group Anapeæ, especially those of the genera *Chasmocephalon* and *Pseudanapis*. It agrees with these in the reduction of the palpus in the female, in the presence of an apophysis on the patella of the male palpus, in possessing a very deep cervical groove, and in the tarsi being much longer than the metatarsi. The taxonomic position of the Anapeæ is, however, by no means well established. It has been discussed by Berland (1924, p. 200), Petrunkevitch (1928, p. 50), Kratochvil (1935, p. 17), and Fage (1937, p. 102). The work of Fage (1937, p. 93) has shown that book-lungs and posterior tracheal tubes are absent in *Chasmocephalon* and *Pseudanapis*, their respiratory system consisting of anterior tracheal tubes only. He suggests placing these two genera and certain others in the family Symphytognathidæ.

As previously indicated, the respiratory system of *Risdonius parvus* conforms to the usual type found in dipneumone spiders. This has been definitely confirmed not only in specimens treated with a solution of caustic potash but also in complete serial sections of female specimens. The book-lungs have about nine leaves. The tracheal spiracle is immediately in front of the spinnerets and leads into two pairs of tracheal tubes, one pair passing upwards and converging on the heart, the other pair passing towards the front of the abdomen. No tracheal tubes enter the cephalothorax.

We know very little about the habits of the Anapeæ, but Kratochvil (1935, p. 17) states that they make an irregular web like that of the Theridiidæ. The web of *Risdonius parvus*, on the other hand, is a typical orbicular web. In the nature of its respiratory system, in possessing serrated setæ modified as spurious tarsal claws, and in the form of its web, *Risdonius parvus* resembles the Argiopidæ. The chitinous wall round the spinnerets is a characteristic which it

shares with members of the subfamily *Gasteracanthinæ*. I have therefore placed it in this subfamily near the genus *Tecmessa*, which also shows certain affinities with *Chasmocephalon* and *Pseudanapis*, but which was removed from association with these genera in the group Anapeæ and transferred to the *Gasteracanthinæ* by Petrunkevitch (1928, p. 50).

I desire to express my thanks to the Trustees of the John Ralston Bequest, under whose auspices the above work was carried out, and to Mr. S. Butler of Melbourne for literature not accessible in Tasmania.

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EXPLANATION OF THE PLATES.

Plate I.

Risdonius parvus, ♂.

Fig. 1. Lateral view of male with legs removed.
2. Carapace and eyes from above.
3. Clypeus and eyes from in front.
4. Sternum, coxæ, maxillæ, and labium.

Plate II.

Risdonius parvus, ♂.

Fig. 5. Prolateral view of leg I.
6. Prolateral view of leg II.
7. End of tarsus showing tarsal claws and serrated setæ modified as spurious claws.
8. A spine from the tarsus of leg I much enlarged.
9. Retrolateral view of male palpus. Genital bulb is slightly expanded.
10. Left chelicera viewed from in front.

Plate III.

Risdonius parvus, ♀.

Fig. 11. Lateral view of female with legs removed.
12. Epigastric scute and epigynum. *a.p.*, aperture for pedicle of abdomen ; *ep.f.*, epigastric furrow ; *p.s.*, right pulmonary spiracle.
13. Left maxilla viewed from in front. *r.p.*, reduced palpus.
14. Egg-sac attached to a grass-stalk.

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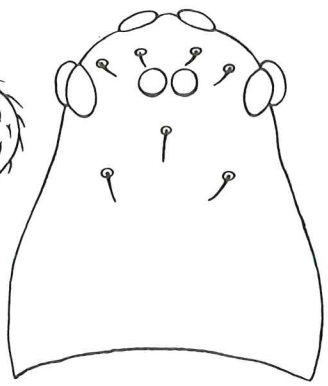

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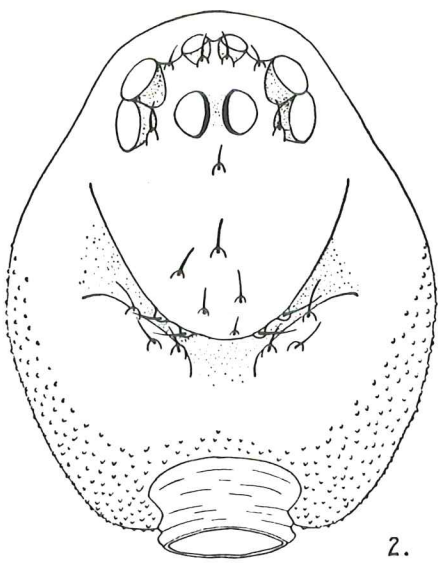

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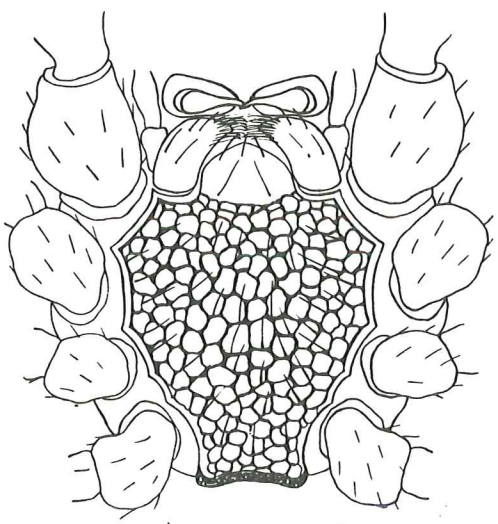

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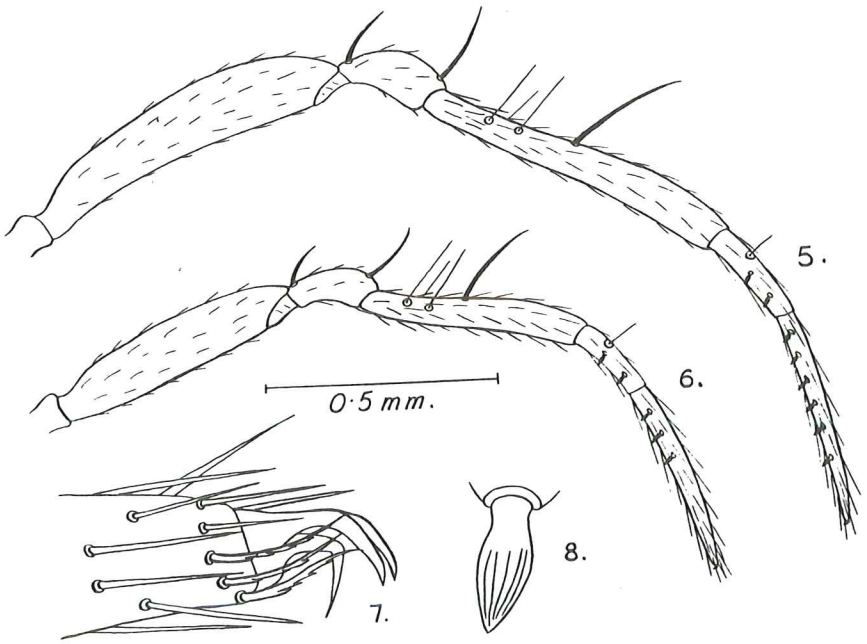

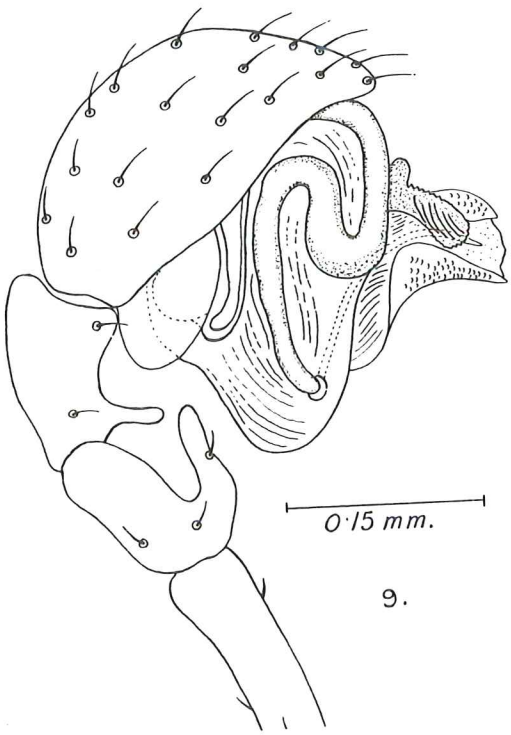

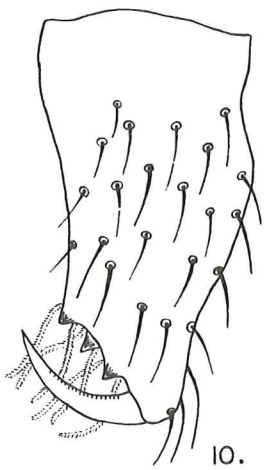

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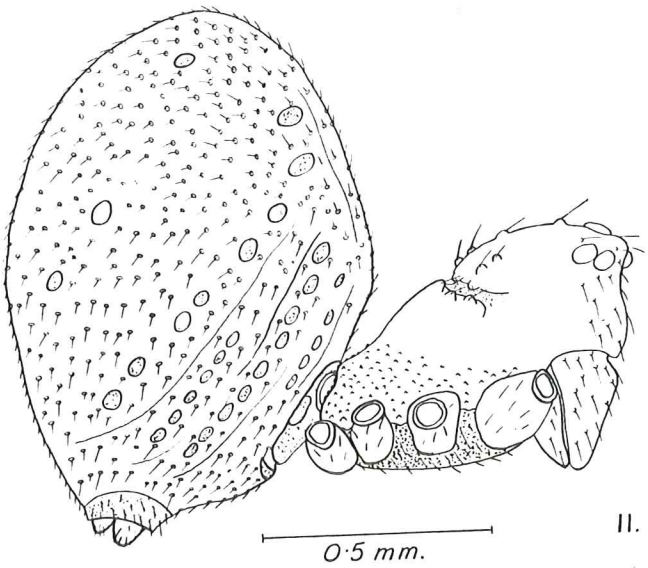
RISDONIUS PARVUS ♂



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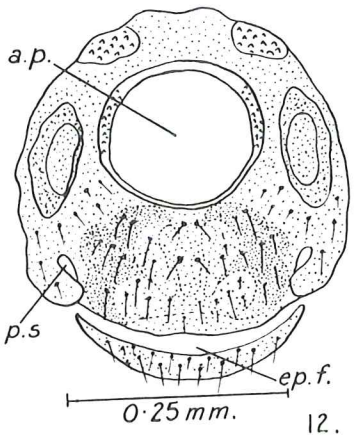

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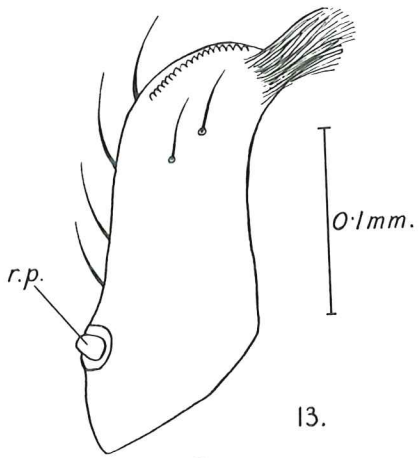

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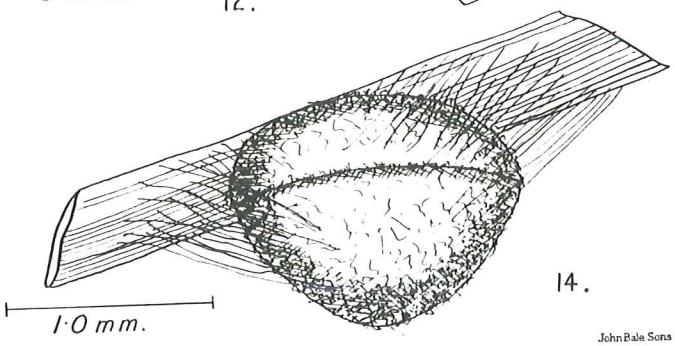

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